# Protecting Biodiversity: Toward the Fair and Equitable Sharing of Genetic Resources

***by Keane Shore***

**Nature's bounty: nothing protects the rights of indigenous farmers**

**(Photo: IDRC)**

Prior informed consent
Communication channels

Five years after the Earth Summit held in Rio de Janeiro, almost 170 countries have ratified the United Nations Convention on Biological Diversity (CBD), which provides a legal framework for the conservation of global biodiversity, the sustainable use of biological resources, and the fair and equitable sharing of genetic resources. But as nations take steps to implement the Convention, the inherent rights of the traditional caretakers of our biological heritage are largely being ignored, argues one of the world's leading agricultural scientists.

Despite the provisions of the Convention, nothing yet protects the rights of indigenous farmers who harbour traditional domestic seed strains or tribal healers who understand the medicinal properties of wild plants to benefit from the commercialization of these resources, says M. S. Swaminathan, former President of the World Conservation Union and winner of the 1987 World Food Prize. Today, commercial plant breeders are more likely to benefit legally and financially from the sale of useful varieties than those who have conserved plant stocks for centuries.

**Prior informed consent**

Part of the difficulty is that while the CBD sets general principles, it leaves the operational details to bilateral agreements between countries, said Dr. Swaminathan during a presentation to staff of the International Development Research Centre (IDRC) in Ottawa. Among other things, the Convention states that access to genetic resources shall be subject to the prior informed consent of the providers, who may grant or deny permission to use them for research or commercial purposes. This clause, he added, "poses a lot of problems in relation to indigenous knowledge and indigenous innovations." For example, when indigenous knowledge appears to be common knowledge that is in the public domain, finding out from whom to obtain informed consent is very difficult. But to ignore this step is to invite charges of "bio-piracy".

"There must be ethical principles in the utilization of the knowledge of indigenous peoples just as there should be ethical principles in the utilization of biological material," said Dr. Swaminathan, adding that debate and discussion on these issues threatens to halt exchanges of biological material between nations.

**Communication channels**

Opening new channels of communication within governments may offer a partial solution to this gridlock, he suggested. Normally, environment ministries are responsible for biological diversity issues, agricultural ministries control farmers' rights, and commerce or trade ministries control intellectual property rights. "In most countries, these people don't sit down together."

Dr. Swaminathan stressed, however, that while talk must continue at all levels to address ethical and equity problems, the main issue is to preserve the world's remaining biodiversity for future generations. "What's important is not to clog the channel of cooperation, but to keep alive the very principle of evolution of agriculture over the last 10,000 years. Agriculture has evolved through material taken by human beings, birds, waves, and air currents. It has been a remarkable unity in the world."

*Keane Shore is an Ottawa-based writer and editor.*

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***Sidebar:***

Biodiversity Conservation in India

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Beyond intellectual property: Toward traditional resource rights for indigenous peoples and local communities

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# Biodiversity Conservation in India

Based in Madras, India, the M. S. Swaminathan Research Foundation is currently studying the relationship between gender and biodiversity in tribal areas of India, where traditional rice and millet varieties are preserved. Here, it is the women who have traditionally sorted seed grains to ensure the sustainability of their communities' grain supply. According to Dr. Swaminathan, there is a need for research on the role of gender in the conservation, use and management of gene stocks; how to value those roles; and how to ensure that the right people benefit from the conservation and commercialization of biological resources.

He noted that India has introduced legislation to protect plant varieties and farmers' rights, which dictates that some of the benefits of biodiversity return to steward communities to strengthen or revitalize their traditions, according to their own priorities. India has also established a technical resource centre to help implement the technical provisions of the Convention on Biological Diversity. Its goal is to help affected villages become more knowledgeable about biodiversity issues, so they can decide for themselves whether to give or withhold consent to those who are interested in using local genetic resources. Dr. Swaminathan recommends the establishment of local gene banks to give communities an economic stake in conservation.

But money is not the only motivation for preserving gene stocks, he stressed. Many tree species have medicine value or play an important ecological role. In India and Bangladesh, forests were traditionally preserved as sacred groves. "Whenever they wanted to conserve something, they used to attach some spiritual value to it," said Dr. Swaminathan.

*Keane Shore*

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The "Value" of Trees, by Jennifer Pepall

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IDRC Reports
STORIES ON RESEARCH IN THE DEVELOPING WORLD

Vol. 23, No. 1 (April 1995)

# Patents on Life Forms: Bio-Piracy?

***by Henry F. Heald***

How can the rights of poor countries be protected amid legal battles over patent protection, intellectual property rights?

The stakes are high in the debate on intellectual property rights and patent protection for life forms. The rights of indigenous peoples and farmers in countries in the South, where most of the important food crops were developed, are under potential threat. Powerful companies in industrialized countries are busy patenting indigenous knowledge built up over generations by farmers in developing countries, a practice some people describe as "bio-piracy." Global policy is emerging almost inadvertently through the patent system, the activities of the biotech industry and court decisions. The issues involved are no longer strictly technical, but ones that have broad social implications.

A new book entitled People, Plants and Patents: The impact of intellectual property on trade, plant diversity, and rural society, does not attempt to reach a consensus on these issues. Rather, it is an effort to "identify trends, concerns and opportunities on intellectual property issues relevant to plant breeding and plant genetic resources."

However, the authors, known as the "Crucible Group" (an international team representing a broad range of interest groups and Southern and Northern countries) do make some strong recommendations. They call upon the United Nations to convene an international conference on society and innovation, "bearing in mind that some people, countries and cultures have deep ethical concerns about biotechnology and the concept of life patenting."

Certainly, there was no agreement among the panelists at an IDRC Forum held last year in Ottawa to discuss the question, "The GATT agreement, biodiversity, and intellectual property: Who wins, who loses? " The discussion ranged from the inclusion of trade related international property rights (TRIPS) in the recent General Agreement on Tariffs and Trade, to the ethics of patenting life forms.

The patent system for dealing with plant and animal genetics is badly out of order, according to Pat Mooney, one of the forum panelists. Mooney is executive director of Rural Advancement Foundation International (RAFI) and a long-time critic of patent protection for biological material.

He believes the most serious fault with the current system is its inability to acknowledge and work with the indigenous knowledge base. "We need to pursue a system that directs the benefits to the innovators in the developing countries."

Geoff Hawtin, a British-Canadian plant breeder who heads the International Plant Genetic Resource Institute in Rome, argued that the TRIPS clause of GATT fails to protect the biodiversity of the developing countries. Companies have moved from patenting a specific gene in a plant to patenting genetic manipulation of a whole species. He argued that the patent system was never intended to be used for life

forms. Some patents have been granted that actually prevent farmers from planting their own seed, he noted.

Hawtin said there is little evidence that patent protection stimulates innovation in this field. Most of the great agricultural advances in the world came about without any patent protection. But with plant breeding being protected by the large agricultural companies, most of the research effort is being put into developing herbicide-resistant crops instead of biological controls.

On the other hand, Marta Gutierrez of the National Agricultural Technology Institute in Argentina argued that patents could be an acceptable way to access technology. She said agriculture in her country strives to operate in a fully competitive atmosphere and that the GATT framework on intellectual property could benefit the industry.

Argentina recognizes biodiversity as the assurance of the future of the agriculture industry, said Gutierrez. It will not deal with anyone who does not abide by the Convention on Biological Diversity.

Professor Anil Gupta of the Indian Institute of Management said intellectual property rights can be useful, but a system that better incorporates the needs of developing countries is required. Indigenous people, whose contribution to biological diversity has been extremely important, should benefit from the knowledge they have accumulated over generations.

Indigenous knowledge has not just been passed intact from generation to generation, it has also been modified at each step through the years. In Gupta's view, biodiversity is being lost in the developing world for a variety of reasons, including economic and environmental factors. Poor, illiterate farmers lack incentives to preserve the old ways. "If we have to preserve biodiversity by keeping people poor, that is a poor choice to make," he said.

Gupta's concern is that the developing countries do not have adequate institutions to manage intellectual property rights and cannot afford the high costs of processing patent applications or fighting challenges in court. Therefore, more patent laws could actually weaken the position of developing countries.

The TRIPS clause of GATT would work if companies were obliged to prove that they had taken genetic material from developing countries lawfully and contractually and that they were prepared to share the benefits equitably with all countries.

Gupta said the developing countries have been promised negotiations for access to new technology in return for the use of the biodiversity they have produced. But the system fails because the responsibility of the consumers has not been identified. Consumers refuse to pay any compensation to the producers of biodiversity.

Pat Mooney argued that the current patent system is too far gone to correct itself and called for a new convention to completely restructure intellectual property rights. He cited examples of large corporations applying for and receiving patents for biological material obtained from developing countries. Mooney described how US firms have patented naturally coloured cotton developed by farmers in Peru and other Latin American countries hundreds of years ago, and how a Texas company has patented a rice variety developed in the Philippines by the International Rice Research Institute. He suggested IRRI is afraid to challenge the patent because it depends on US funds.

To those who suggest that developing countries can ignore the GATT provisions, Mooney noted that legislation now before the US Congress would tie US aid to how quickly the recipient countries adopt the GATT/TRIP rules. He criticized a system that allows companies to patent blood cells of aboriginal people from the Solomon Islands or to patent thousands of DNA fragments from the human brain.

Pat Mooney and Geoff Hawtin are both members of the Crucible Group and thus are two of the authors of People, Plants, and Patents. The book offers no simple remedies, but tries to steer a course through the

maze of questions. On the most contentious issues, it offers three different viewpoints for argument, discussion and further research. It also presents a series of recommendations that, if followed, could help a government design a rational and workable national program.

Although People, Plants, and Patents leaves certain questions open to discussion, it is united on two fundamental points: people in the countries with a rich heritage of biodiversity should be allowed to benefit from that heritage; and intellectual property rights should encourage innovation that benefits everyone and promotes conservation of genetic diversity.

**Available from IDRC Books:**

> People, Plants, and Patents: The impact of intellectual property on trade, plant biodiversity and rural society by the Crucible Group.
> IDRC 1994, ca 100 pp.,
> ISBN 0-88936-725-6, CA$12.95 (Also available in French and Spanish.)

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# Protecting Natural Resources: Bioaccess Legislation in Laos

***by Richard Littlemore***

**Much is still unknown about Laos' biodiversity and its cultural significance**

Tucked away in the mountains of Indochina, the Lao Peoples' Democratic Republic has until now escaped much of the pressure the global economy exerts on the natural resources of the region. Its environment, therefore, is still relatively healthy by current standards.

Nonetheless, the legacy of the "Viet Nam" War and other environmental pressures are felt in Laos. At the time of the Viet Nam conflict, the US dropped hundreds of thousands of tons of high explosives and napalm on Laos. Old bombs and mines still kill and maim every year in rural areas. While direct damage from the conflict on natural resources was localized, the resettlement and human displacement it produced has been a major cause of environmental degradation. And while perhaps only 7% of Laos' 123 million hectares is cultivated in a permaculture sense, most of it is too rugged to cultivate. A large area is under "shifting cultivation," which implies varying degrees of domestication.

To some extent, Laos' low population density has eased the environmental impact of human activity. With a population in 1995 of 4.6 million, population density in Laos is 19.4 people per square kilometre. By comparison, China, with over a billion inhabitants, has 129 people per square kilometre. In Viet Nam, where 78 million people live, population density is higher still, at 223 people per square kilometre.

**Rich biodiversity**

Accidents of geography have endowed Laos with unusually rich biodiversity resources. The country

straddles several biological zones since it sits on the boundaries of the Himalayan, Indo- Malayan, and Chinese regions. There are flora and fauna representative of each of these regions in different parts of the country. Laos is highly moutainous, which creates wide variations in climate, soils, and ecological niches, leading to locally adapted and diverse biota. In addition, Laos is home to more than 40 major ethnic groups, each with different cultural traditions, which has helped foster genetic diversity through selective use or cultivation of specialized plants and plant varieties.

Finally, owing to the Viet Nam conflict and its physical and political isolation, Laos has until recently been sheltered from many of the forces acting to reduce biodiversity. Examples of these forces include improved commercial rice varieties, commercial logging that destroys habitat, large-scale resource development and agroindustry. However, as the economy of Laos opens up to the outside world, all this is beginning to change rapidly, and threats to the country's biodiversity resources are emerging. During the 1980s, the countryside of Laos was deforested at an average annual rate of 129,000 hectares — a rate that is increasing steadily.

These factors and the advent of the Convention on Biological Diversity (CBD) have underscored the need for Laos to develop its own legislation to control access to its biodiversity. Signatory countries agree in the Convention to provide direct access to national genetic resources such as plant species to outside agents, but in return have the right to enact legislation that protects their interests and guarantees domestic returns on any commercial benefits. Such legislation is new and controversial everywhere in the world. In Laos there are no legal or biodiversity experts able to draft such legislation, but without it the country's biodiversity resources lie open to direct exploitation under the terms of the CBD, which Laos signed in 1995, but has yet to ratify.

**Pioneering initiative**

Domestic control over the use of Laos' biodiversity resources is the goal of a pioneering international initiative to research and draft biodiversity access legislation for Laos. Jointly funded by IDRC and the MacArthur Foundation of Chicago, the project recipients are the University of British Columbia (UBC) and the Science, Technology and Environment Organization (STENO) in the Lao Prime Minister's office. Project research is being conducted by Vo-Tong Xuan, Vice-Rector of Cantho University in Viet Nam; the Centre of Asian Legal Studies (CALS) at UBC; and the Third World Network (TWN) in Penang, Malaysia.

A member of the Viet Nam National Assembly, Dr Xuan is an expert both in the transition from communism to a more open economy and in the importance of agricultural and biological self-reliance. He is credited, for example, with playing a leading role in the transformation of Viet Nam from a rice importer in the early 1980s to the third largest rice exporter in the world — in less than than 5 years.

"As a Communist country, the Lao government does not allow visitors total freedom of access to the countryside. But this policy is likely to change in the near future," says Xuan. "[As a result,] the original biodiversity is likely vulnerable to bioprospecting without the knowledge of the indigenous people. With advanced knowledge on bioaccess legislation, the Lao people at all levels will be able to preserve and make use of their biodiversity in a more efficient way. This knowledge can then be extrapolated to other areas of similar conditions in South and Southeast Asia," he added.

**No experience**

According to Russell Wills, of the CALS, the project to draft bioaccess legislation faces two main challenges. First, it is difficult to protect biological resources if the exact nature of those resources has not yet been identified. And second, Laos has a dearth of technically educated citizens who are capable of cataloguing the nation's resources. Another problem, perhaps more serious, is that Laos has no experience with the legal provisions involved in this type of legislation.

Not only is the biodiversity of Laos largely unknown and undocumented, except for some decades-old French botanical catalogues, but the structure and approach of the legislation will depend to some extent on the importance and uses of biodiversity to local people -- again, a topic about which little is known. NGOs — such as Norwegian Church Aid, CUSO, and the International Union for the Conservation of Nature — all have experience with rural development projects that involve some aspect of biodiversity use and management at the village level in Laos. Therefore, their support is being enlisted to design appropriate field methods to gain the information needed about biodiversity use and value in Laos so that the legislation can be suitably structured. Fieldwork to collect this information, and later test legislative models, will be done by staff of these NGOs, after they are trained in biodiversity issues. In addition, STENO staff in the Prime Minister's office will receive similar training and will also be trained by the CALS, Dr Xuan and Gurdial Singh of the TWN in legislative and policy issues.

*Richard Littlemore is a writer based on Bowen Island, British Columbia.*

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**Resource Persons:**

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**Gurdial Singh**, Third World Network, Penang, Malaysia; E-mail: twnpen@twn.po.my

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# Links to explore ...

Related IDRC articles and publications:

- In Person: Vo-Tong Xuan
- Beyond intellectual property: Toward traditional resource rights for indigenous peoples and local communities by Darrell A. Posey and Graham Dutfield, IDRC, 1996
- People, plants, and patents: The impact of intellectual property on trade, plant biodiversity and rural society The Crucible Group, IDRC, 1994
- Protecting Mexico's Tropical Forests: The Calakmul Model Forest Program by Michael Boulet
- Patents on Life Forms: Bio-Piracy? by Henry F. Heald

Additional resources:

- Sustainable Use of Biodiversity (SUB)
- Rural Advancement Foundation International (RAFI)

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# Putting a Price on Indigenous Knowledge

***by Jennifer Pepall***

**Who benefits from commercialization of biodiversity?**

A single dose of "dragon's blood" — named after a plant whose stem leaks a red latex — can treat a range of ailments. Taken orally or applied directly to wounds, the latex is used for coughs, flu, diarrhea, open sores, and stomach problems. Its healing properties make it one of the most popular traditional medicines in Latin America.

Consumers in the North may soon be able to buy dragon's blood at a neighbourhood pharmacy. Shaman Pharmaceuticals, a San Francisco drug company, is currently developing SP-303, a derivative of the latex-producing plants. Laboratory tests have shown that SP-303 is an effective antiviral agent.

SP-303 is one of approximately 35,000 plants in the developing world that are believed to have medicinal value. Overall, the South is home to around two-thirds of the world's plant species. This rich biodiversity yields huge amounts of cash as well as new medicines. For example, a report by the Ottawa-based Rural Advancement Foundation International (RAFI) has estimated that in the early 1990s, germplasm from developing countries was worth at least US$32 billion per year to the pharmaceutical industry.

While the benefits to drug companies are clear, the contributions of indigenous peoples, whose knowledge and innovation are often the key to drug development, generally go unrewarded. "Indigenous people do not gain much [financial] recognition from international organizations for their knowledge. Only laboratory knowledge seems to be worth something," said Luis Antonio Ortega Miticanoy, a lawyer and activist with indigenous groups in Colombia, during a 1995 IDRC development forum held in Ottawa.

**Relationship to the environment**

But attitudes are changing. At the 1992 Earth Summit, the United Nations Convention on Biological Diversity recognized the importance of traditional practices in the conservation and sustainable use of biodiversity. These practices are rooted in the relationship of indigenous peoples to their environment. For example, the Dene People of Canada's Northwest Territories believe they are caretakers of the land and must pass it intact to their children — a philosophy shared by other indigenous communities around the world. "The land and biodiversity are a loan that has been given to us by future generations. It doesn't belong to us, we are just passing through," explained Miticanoy.

For indigenous groups, the Earth's genetic resources provide more than just food and medicine: they are intrinsically linked to cultural identity. "There is extraordinary overlap between indigenous peoples and their cultures and those areas considered to be of high biodiversity," said Steven King, Vice-President of Shaman Pharmaceuticals.

Not surprisingly, the conservation of biodiversity is closely linked to the needs and aspirations of indigenous peoples. One example is the environmental destruction that results when indigenous people are forced off their land. In Colombia, forests are disappearing as loggers cut trees for timber and clear land for livestock and cultivation, said Miticanoy.

Today, indigenous communities in the South are increasingly joining forces to defend their rights against powerful interests, such as pharmaceutical companies searching for new products and governments desperate for new sources of income. A central issue is their demand for financial compensation for their knowledge.

"Genetic piracy has subjected us to colonialism," said Miticanoy, who is lobbying for a more equitable sharing of technology and resources in which indigenous peoples receive their due. "We know we are part of a larger society, [but] we are few in number. What we want is the larger number to recognize our own things and our own rights," he concluded.

*Jennifer Pepall is a writer based in Ottawa.*

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### *Sidebars*

Shaman Pharmaceuticals: Socially Responsible Drug Development

Farmaya and Ethnobothany in Guatemala

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**Resource Persons:**

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Protecting Mexico's Tropical Forests: The Calakmul Model Forest Program by Michael Boulet

Iwokrama: Guyana's Rainforest for the World by Claudette Earle

Patents on Life Forms: Bio-Piracy? by Henry F. Heald

Monocultures, Monopolies and the Masculinisation of Knowledge: A discussion of gender, biodiversity and ownership of life forms by Vandana Shiva

Additional Resources

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# TRAMIL research network: Validating the healing powers of medicinal plants

***by Frank Campbell***


**Medicinal plant plantation in Costa Rica**

**(Photo: J. M. Fleury, IDRC)**



For 80 percent of humanity, traditional medicine is a way of life. In South Asia, 800 million people seek health security not in needles and pill bottles, but from the leaves, roots and barks of trees.

In fact, some 25 percent of the drugs prescribed by European and North American physicians are derived from plants found in the forests of the South. According to Professor Sonia Uriarte of the School of Chemical Sciences, National Autonomous University of Nicaragua (UNAN-Leon), "practically all these plants have been 'discovered' through information derived about their use in traditional medicine."

**Traditional knowledge disappearing**

But this traditional, plant-based medicine is in danger. Around the world, valuable local knowledge is being lost as useful plant species disappear. To address this problem, a project supported by the

International Development Research Centre (IDRC) is helping mothers, midwives, and scientists in the Caribbean basin learn more about the risks and benefits of medicinal plants.

In 1982, the TRAMIL (Traditional Medicine for the Islands) research network was launched in the Dominican Republic by the international NGO, ENDA-Caribe, under the leadership of Dr. Lionel Germosen-Robineau. With funding from IDRC, a regional office for Central America (Belize to Panama) was established in 1994. The goal of TRAMIL is to provide scientifically proven alternatives to patent drugs, which are becoming scarcer and more expensive due to increasing poverty and dwindling foreign currency reserves. The network — which recognizes that many rural people are more familiar with medicinal plants — aims to ensure the safety, efficacy, and accessibility of natural medicines.

**Surveying rural populations**

The TRAMIL approach involves surveying rural populations to find out which plants are used most often by mothers to deal with common family illnesses, such as skin conditions, diarrhea, and other gastrointestinal problems. (TRAMIL does not address potential treatments for more serious illnesses, such as AIDS and cancer.) For each plant, researchers examine the benefits, chemical make-up, and potential dangers. Their findings are then communicated to the mothers and their communities, including which are safe, which are toxic, and which need further study.

So far, the TRAMIL team — which includes scientists in more than 18 different island and mainland countries — has evaluated over 150 medicinal plants. The results have been disseminated in a variety of forms including the *Caribbean Pharmacopeia*, which provides detailed information on plants or parts of plants and their uses; pamphlets, videos, music, dance, puppet shows, and community meetings. Meanwhile, a few universities in the region have started using the *Caribbean Pharmacopeia* to teach future doctors, nurses, and pharmacists about the use of medicinal plants described in primary health care programs.

**Conservation strategies**

In addition to these activities, TRAMIL is also involved in local and national conservation strategies to preserve biodiversity and ensure the sustainable use of medicinal-plant resources. For example, TRAMIL is encouraging Central American families to establish home gardens for medicinal plants rather than exploiting wild colonies.

During an evaluation of TRAMIL, Margarita Oseguera, Professor of Sociology and Rural Development at the National Autonomous University of Hondura, called it "one of the most needed and valuable projects in the region at present." According to Dr. Oseguera, the network benefits from "the collaboration of renowned scientists in each country who believe in the objectives of the project."

**Highly respected work**

Dr. Sonia Lagos-Witte, Regional Coordinator of TRAMIL-Central America and the IDRC project leader, adds that TRAMIL's work is highly respected within the scientific community, especially in Latin America and the Caribbean. She reports that the Ministries of Health in Panama, Nicaragua, and Honduras are willing to give official recognition to the TRAMIL program, which will clear the way for local health workers to use medicinal plants in their efforts to bring healing to their communities.

*Frank Campbell, a former Guyanese ambassador, is now an Ottawa-based communications consultant who writes regularly on international development issues.*

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## Resource Persons:

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